REMARKS

Claim 1 has been amended to recite that the graft polymer is produced by irradiating a polymer substrate with radiation and then exposing the substrate to a graft-forming monomer, and that the biologically active compound moiety is covalently bonded to the polymer substrate through a graft chain. This is supported by the disclosure at page 10, lines 2-19 of the specification.

Claims 23 and 25 have been cancelled.

Attached hereto is a marked-up version of the changes made to claim 1 by the current amendment. The attached page is captioned "**Version with markings to show changes made.**"

The patentability of the present invention over the disclosures of the references relied upon by the Examiner in rejecting the claims will be apparent upon consideration of the following remarks.

Thus, the rejection of claims 1-7, 11, 24 and 26 (claims 23 and 25 having been cancelled) under 35 U.S.C. §102(b) as being anticipated by Guire is respectfully traversed.

As shown in amended claim 1, the polymer substrate of the present invention is limited to a polymer grafted by the irradiation graft method. The polymer has graft chains linked to the surface of the polymer substrate and therefore the surface of the polymer is much more reactive. According to amended claim 1, a biologically active moiety is linked to a graft chain of the graft polymer substrate through or not through a linking group.

On the other hand, Guire does not teach or suggest the use of a graft polymer as the solid surface. Guire teaches the use of a linking group such as an alkyl group having 1-10 carbon atoms (column 6, lines 24-27), which is different from the graft chain of the graft polymer of the present invention. As is well known in the art, the graft chain, which is composed of a part of a graft polymer, is made of polymerized monomer compound (or a kind of polymer) and has a considerably high molecular weight, in contrast to an alkyl group having 1-10 carbon atoms.

For these reasons, Applicants take the position that the presently claimed invention is clearly patentable over the Guire reference.

The rejection of claims 1-6, 11, 24 and 26 under 35 U.S.C. §102(e) as being anticipated by Patnaik et al. '165 is respectfully traversed.

Similarly to the discussion set forth above concerning the distinctions between the present invention and the Guire reference, it is apparent that the polymeric spacer with amine terminal bonds of Patnaik et al. '165 clearly differs in structure and in molecular size from a graft chain of a graft polymer. A graft polymer has graft chains linked to the surface of the polymer substrate and therefore

the surface of the polymer is much more reactive, as a result of which it will become easy to link a biologically active compound on the surface of the polymer substrate.

Accordingly, Applicants submit that the present invention is patentable over Patnaik et al. '165.

The rejection of claims 8-9 under 35 U.S.C. §103(a) as being unpatentable over Guire in view of the Notice under MPEP 2148.05 is respectfully traversed.

It seems that the Examiner meant to refer to MPEP 2144.03 (there is no §2148.03 of MPEP).

The comments set forth above concerning the Guire reference are equally applicable to this rejection.

Therefore, even if the MPEP Notice is combined with the Guire reference, the result of such combination would still not suggest the subject matter of claims 8-9.

The rejection of claims 6-9 under 35 U.S.C. §103(a) as being unpatentable over Patnaik et al. '165 in view of the MPEP Notice is respectfully traversed.

Referring to the distinctions between the present invention and Patnaik et al. '165 as discussed above, it is apparent that even if this reference were combined with the MPEP Notice, the resultant combination would still not suggest the subject matter of claims 6-9.

The rejection of claims 1-6, 11 and 30-31 under 35 U.S.C. §102(b) as being anticipated by Sugo is respectfully traversed.

Sugo discloses a graft polymer into which functional groups of an amino or imino group are combined with a carboxyl or oxime group. The graft polymer having those combined functional groups exhibits an antifungal activity, which is not a selective biological activity. That is, the graft polymer of Sugo is a polymeric antifungal compound.

In contrast, according to the present invention, a biologically active compound moiety such as an antibiotic is covalently linked to a graft polymer. Such a moiety is not a functional group, but is a part of an active compound having selective biological activity.

Accordingly, the graft polymer of the present invention, and therefore the invention itself, is different and unobvious from that of Sugo.

The rejection of claims 1-7, 9, 11 and 31 under 35 U.S.C. §102(e) as being anticipated by Goldberg et al. is respectfully traversed.

Goldberg et al. discloses a method for modifying the surface of a material adapted for contact with tissue of a human or non-human animal to impart biofunctional, bioactive or biomimetic

properties to the surface. The surface of a material is modified by exposing the surface to a solution of (a) an ethylenically unsaturated monomer and (b) at least one biofunctional agent, and then irradiating the surface with gamma or electron beam irradiation in the presence of the solution, thereby forming on the surface a graft polymerized coating. The coating thus formed has physically entrapped therein or chemically bonded thereto molecules of at least one biofunctional agent.

On the other hand, according to the present invention, a bioactive compound is covalently bonded to a graft chain of a graft polymer which has been produced before reacting it with the bioactive compound.

By the method of Goldberg et al., all of the active compounds could not always be covalently bonded to a graft chain to thereby maintain its activity after being bonded.

Therefore, the present invention is considered to be patentable over the Goldberg et al. reference.

In view of the foregoing amendments and remarks, it is submitted that each of the grounds of rejection set forth by the Examiner has been overcome, and that the application is in condition for allowance. Such allowance is solicited.

Respectfully submitted,

Yasuo FUKAGAWA et al.

By: _____

Michael R. Davis
Registration No. 25,134
Attorney for Applicants

MRD/pth
Washington, D.C. 20006-1021
Telephone (202) 721-8200
Facsimile (202) 721-8250
March 6, 2003

OIPE
MAR 0 6 2003
PATENT & TRADEMARK OFFICE

Version with Markings to Show Changes Made

1. (Four Times Amended) A biologically active polymer product having:

a water-insoluble graft polymer substrate, and

a biologically active compound moiety having a molecular weight of not more than 5,000, the moiety being covalently bonded to the polymer substrate and exerting selective biological activity,

wherein said graft polymer is produced by irradiating a polymer substrate with radiation and then exposing the substrate to a graft-forming monomer, and

wherein the biologically active compound moiety exerts the selective biological activity while being covalently bonded to the polymer substrate through a graft chain.